Cognitive Function and Dental Care Utilization Among Community-Dwelling Older Adults

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Objectives. We sought to investigate the relationship between varying levels of cognitive function and dental care utilization.

Methods. Using data obtained from the National Health and Nutrition Examination Survey (1999–2002), we performed weighted descriptive and multivariate logistic regression analyses on 1984 individuals with at least 1 tooth and who were 60 years and older.

Results. Multivariate analyses suggested that level of cognitive function was associated with dental care utilization. At a higher level of cognitive functioning, individuals were more likely to have had more frequent dental visits. In addition, a higher level of socioeconomic status, healthy lifestyle, and worse self-rated oral health–related symptoms were more likely to indicate a higher frequency of dental care utilization. By contrast, poorer oral health status as determined by clinical examinations was negatively associated with frequency of dental visits.

Conclusions. The results suggest that community-dwelling older adults with low cognitive function are at risk for less frequent use of dental care. Oral health serves as a mediating factor between cognitive function and dental care utilization. There is a great need to improve oral health awareness and education among older adults, caregivers, and health care professionals. (*Am J Public Health.* 2007; 97:2216–2221. doi:10.2105/AJPH.2007.109934)

Adults 65 years and older are the fastest growing segment of the population in the United States. The number of older adults will climb from 35 million—12.4% of the US population in 2000—to about 55 million or 16.27% in 2020.[1] An estimated 8% to 10% of older adults have dementia,[2,3] and an estimated additional 17% to 19%[4,5] have more mild cognitive impairment that does not meet the threshold for dementia. Among the many health care issues that these individuals face, dental care is one that may have serious repercussions if overlooked. Neglect of dental care may lead to tooth decay, pain, tooth loss, and inflammation. More importantly, untreated or delayed dental diseases affect nutrition status, cause oral dysfunction, and ultimately affect an individual's quality of life.[6]

Numerous factors are reportedly associated with lower use of dental care or greater unmet dental care needs: older age, male gender,[7–10] lower income, lack of dental insurance,[11–13] poorer health status, more chronic conditions,[14,15] smoking,[16,17] and poorer oral health status.[18,19] Limited evidence indicates that, compared with older individuals with no dementia, elderly adults with dementia have poorer oral health and more often do not receive needed dental care.[20–22] But even less is known about dental care utilization among those with low cognitive function or mild impairment insufficient to meet the criteria for dementia.

One study of a small, regional sample found, through bivariate analyses, that individuals with a greater deficit in cognitive functioning were less likely to have reported getting dental care.[23] A second study, by Walsh et al., found that, after control for respondents' sociodemographic characteristics and other risk factors, individuals with relatively low or moderate cognitive function were significantly less likely to have dentist visits compared with those with high cognitive function. Walsh et al. used a nationally representative sample from the Asset and Health Dynamics Among the Oldest Old study to examine the impact of cognitive function on dental care.[24] However, because of the limitations of the data, Walsh et al. were not able to include some important variables, such as clinical examinations of oral health status and self-rated oral health–related quality-of-life measures, and dental insurance coverage in the analysis. Without these measures, the effect of cognitive function on dental care utilization might be biased and inaccurate because there is a relationship among cognitive function, oral health, and dental insurance.

For our study, we used the National Health and Nutrition Examination Survey (NHANES), which is unique in that it is a large, representative national sample that includes detailed clinical and self-reported measures of oral health, as well as information on cognitive function. With this study, we aimed to fill the gaps in current knowledge by investigating the linkage between cognitive function and dental care utilization while we controlled for many important covariates such as sociodemographic characteristics, physical health, and health behaviors, with the addition of variables that have not previously been studied, such as oral health status and dental insurance.

On the basis of previous studies findings, we offer the following hypothesis: a higher level of cognitive function has a positive impact on dental care utilization. After we control for oral health status and other covariates such as sociodemographic characteristics and physical health, a higher level of cognitive function will still have a positive, although smaller, impact.

METHODS

Data Source

We used NHANES data from 1999 through 2002. NHANES is a population-based survey designed to collect information on the health and nutrition of the US population and uses a stratified, multistage, clustered sampling design to obtain a representative sample of the noninstitutionalized civilian US population. The NHANES data were collected during an in-home interview and a health examination conducted in a mobile examination center. Beginning in 1999, the NHANES became a continuous annual survey rather than a periodic one. Currently, survey data for 1999 through 2002 are available for public use.

Sample Population

The sample included dentate individuals (i.e., those with at least 1 tooth), who were 60 years and older, who were administered the cognitive test, and who completed at least 1 oral health examination. Edentulous individuals (i.e., those with no teeth) were excluded from the sample because previous research has shown dramatic differences in the patterns of dental visits by dentate versus edentulous individuals, with the latter having far fewer dental visits.[8,15]

On the basis of these criteria, 1984 (57.5%) of the 3706 respondents aged 60 years and older were eligible from the 1999–2002 survey data. Edentulous individuals accounted for the largest number of nonparticipants—83% of all those deemed ineligible.

Measures

Two variables were constructed to reflect dental care utilization. For the variable of time since last dental visit, the respondent's response to the question "When did you last visit a dentist?" was coded as an ordinal where 1=5 or more years ago (including never have seen a dentist), 2=less than 5 years but equal to or more than 3 years ago, 3=less than 3 years but equal to or more than 2 years ago, 4=less than 2 years but equal to or more than 1 year ago, 5=less than 1 year but equal to or more than 6 months ago, and 6=less than 6 months ago. For the variable "frequency of regular checkups," self-reported information was coded as an ordinal variable where 1=whenever needed, no regular schedule; 2=less than once a year; and 3=once a year; and 4=2 or more times a year.

Cognitive performance was measured with the Digit Symbol Substitution Test (DSST),[25] which primarily assesses psychomotor performance, but sustained attention, response speed, visuomotor coordination, and incidental memory all contributed to performance on this measure. The individual uses a visual key that displays nonsense symbols paired with numerals 1 to 9 to fill in the appropriate symbol in a series of small blank squares each paired with a randomly assigned number. The score ranges from 0 to 133 points and it is calculated by totaling the number of squares filled in correctly. The DSST is highly sensitive to any type of brain dysfunction and it discriminates well between mild dementia and normal cognition.[26] Based on the DSST score, we divided respondents into 5 groups: group 1 (below 5th percentile), group 2 (5th to 14th percentile), group 3 (15th to 24th percentile), group 4 (25th to 49th percentile), and group 5 (50th percentile and above).

Covariates

For sociodemographics, we included age (measured in years), gender (female=1), marital status (married or living with partner=1), dummy variables for Black, and Hispanic (with White and other races/ethnicities combined as the omitted group in the multivariate analyses), education (from 1=less than high school to 3=some college or more), income measured by Poverty Income Ratio (a ratio of family income to the US Census Bureau's poverty threshold for the calendar year the individual was interviewed), and dental insurance coverage (having coverage=1).

Physical health problems were defined as reported functional impairment or presence of any of the following medical conditions: diabetes, heart disease (i.e., congestive heart failure, coronary heart disease, angina, or heart attack), high blood pressure, stroke, arthritis, and lung disease (i.e., asthma, emphysema, or chronic bronchitis). Functional impairment was defined as self-reported limitations of activities of daily living (eating, dressing, walking, and getting in and out of bed) and instrumental activities of daily living (managing money, doing household chores, preparing meals, and shopping). The presence of any reported limitations was coded as 1; no reported limitations was coded as 0. A summary scale of limitations of activities of daily living and instrumental activities of daily living combined was created by adding 1 point for each limitation from these 8 activities (range from 0 to 8).

We included 4 health behaviors in our analysis: smoking (smoking=1), drinking, physical activity, and diet. Drinking was coded as self-reported light or moderate drinker (between 12 drinks in the past 12 months and less than 2 drinks per day) and heavy drinker was coded as 2 drinks per day or more in the previous 12 months.[27] Physical activity was defined as self-reported moderate or vigorous physical activity (i.e., at least 10 minutes of exercise that causes slight or heavy sweating or a slight to moderate or large increase in breathing or heart rate) in the past 30 days. Diet was measured by the Healthy Eating Index.

For oral health status, the number of decayed and missing teeth was determined based on a clinical examination by a dentist. Periodontitis was defined as the presence of a probing pocket depth of more than 4 mm or loss of attachment of more than 3 mm.[28]

For self-rated oral health status, the self-reported general condition of the mouth and teeth was from 1=poor to 4=very good. The sum of the following 3 variables was used to reflect self-reported hyposalivation in the study: (1) the amount of saliva in the mouth (too little=1), (2) difficulty swallowing food (yes=1), and (3) mouth feels dry when eating food (yes=1).[29] Self-reported tooth pain in the past 30 days (tooth pain=1) was also included as a covariate.

Analysis

We used SAS version 9.1 for all analyses (SAS Institute Inc, Cary, NC). We used the function PROC SURVEYLOGISTIC to perform cumulative logit models on 2 dependent variables: last dental visit and frequency of routine dental checkups. We used a hierarchical block design in the analyses to determine the separate contributions of sociodemographic characteristics, cognitive function, physical health, and oral health. In step 1, we included the cognitive function measure and sociodemographic characteristics. In step 2, we added physical health and health behavior variables. In step 3, we added oral health measures. Some medical conditions, such as high blood pressure, stroke, and arthritis were excluded in the multivariate analysis models because they were not significant in the bivariate analysis. Exploratory analysis showed that the variables periodontitis, past smoker, and heavy drinker were not significantly associated with dental care utilization. In addition, 521 individuals in the sample did not complete a periodontal disease examination. Therefore, these variables were not included in the final models.

TABLE 1—Weighted Sample Characteristics of Dentate Individuals 60 Years and Older (N = 1984): United States, National Health and Nutrition Examination Survey, 1999–2002

Cognitive function (0–117)	
DSST score,[a] % (SE)	
< 5%	6.85 (0.41)
5%–14%	18.05 (0.27)
15%–24%	26.94 (0.27)
25%–49%	37 (0.19)
≥ 50%	59.16 (0.38)
Sociodemographics	
Age, range = 60–85 y, mean (SE)	70.22 (0.31)
Women, % (SE)	54.58 (0.91)
Education, % (SE)	
Less than high school	23.52 (1.4)
High school	27.58 (1.32)
More than high school	48.9 (1.74)
Race/ethnicity, % (SE)	
White	83.94 (1.83)
Black	6.48 (1.02)
Hispanic	6.98 (1.39)
Other	2.59 (0.72)
Poverty Income Ratio, range = 0–5, mean (SE)	3.01 (0.08)
Dental coverage, % (SE)	36.9 (2.2)
Health status and behaviors	
Diabetes, % (SE)	12.7 (0.8)
Heart disease, % (SE)	17.51 (1.34)
Lung disease, % (SE)	14.08 (1.01)
ADL and IADL score, range = 0–8, mean (SE)	0.8 (0.04)
Healthy Eating Index score, range = 0–100, mean (SE)	68.07 (0.44)
Current smoker, % (SE)	9.24 (0.94)
Light and moderate drinker, % (SE)	38.78 (2.63)
Moderate or vigorous physical activity, % (SE)	55.11 (1.73)
Oral health status	
Clinical examinations	
Decayed teeth, range = 0–28, mean (SE)	0.43 (0.05)
Missing teeth, range = 0–28, mean (SE)	8.25 (0.23)
Periodontitis,[b] % (SE)	70.97 (1.84)
Self-reported oral health	
Hyposalivation score, range = 0–3, mean (SE)	0.15 (0.01)
Tooth pain, % (SE)	8.81 (0.7)
Self-reported general mouth and tooth condition, % (SE)	
Poor	12.4 (0.98)
Fair	22.65 (1.46)
Good	39.36 (1.41)
Very good	25.59 (1.8)

Note. DSST = Digit Symbol Substitution Test; ADL = activities of daily living; IADL = instrumental activities of daily living. Dentate individuals are those with at least 1 tooth.
[a]The DSST primarily assesses psychomotor performance but also sustained attention, response speed, visuomotor coordination, and incidental memory. The score ranges from 0 to 133 points; respondents were divided into 5 groups according to DSST score percentile.
[b]The sample size for periodontitis was n = 1463.

RESULTS

Table 1 shows that there was a great amount of variation in individuals' performances on the DSST. The bivariate analysis showed that, as the level of cognitive function increased, individuals had more recent dental visits and more frequent dental checkups. Based on the code for the measure "time since the last dental visit," which ranged from 1 to 6, the mean score for the 5 cognitive function groups (from group 1 to group 5) was 3.10, 3.93, 4.27, 4.58, and 5.11, respectively. For the measure of frequency of dental checkups, ranging from 1 to 5, the mean score for group 1 to group 5 was 1.43, 1.86, 2.39, 2.53, and 2.97, respectively (results not shown in the tables).

Multivariate Analysis

Time since the last dental visit. There was a progressive, increased likelihood of a shorter interval since the last dental visit being associated with increased level of cognitive performance on the DSST when we controlled for sociodemographic characteristics, physical health status, health behaviors, and oral health status (Table 2). However, the odds ratio (OR) of DSST performance on the time since the last dental visit became smaller after the addition of physical health and oral health status variables into the model. In step 1 (only control for sociodemographic characteristics), for each additional higher level of cognitive function, the odds of a shorter interval since the last dental visit increased 23% (OR = 1.23; 95% confidence interval [CI] = 1.09, 1.37). In the fully specified model (step 3), the increased likelihood was 13% (OR = 1.13; 95% CI = 1.01, 1.26).

Poorer oral health status (i.e., higher number of decayed and missing teeth), based on the clinical examinations, was associated with more time since last dental visit. By contrast, individuals with better self-reported general oral health were more likely to have had a more recent dental visit. On the other hand, individuals who reported having tooth pain and a greater hyposalivation score were likely to have had a more recent dental visit. In addition, some other variables were significant in the model. Greater age, higher levels of education and income, healthy diet, and moderate drinking were positive factors; diabetes and heart disease were negative factors.

Regular dental checkups. When we controlled for sociodemographic characteristics, increased level of performance on the DSST was associated with increased odds of having more frequent dental checkups (OR = 1.26; 95% CI = 1.10, 1.45). This OR was reduced somewhat when we controlled for physical health and health behaviors (OR = 1.16; 95% CI = 1.01, 1.32). However, when oral health status measures were introduced into the model, the cognitive performance variable became insignificant. Similar to findings concerning the interval since the last dental visit, higher numbers of decayed and missing teeth were negatively associated with frequency of regular dental visits, whereas individuals with poorer self-rated hyposalivation score were likely to have a higher frequency of regular dental visits. In addition, better reported general oral health status had a positive effect on frequency of regular dental visits.

Some other variables were found to be positively associated with frequency of regular dental checkups: female gender, a higher level of education and income, dental insurance coverage, and healthy lifestyle. By contrast, having diabetes was negatively related to regular dental visits.

TABLE 2—Results of Cumulative Logit Models for the Recent Dental Visit and Regular Visits (Weighted) Among Dentate Individuals 60 Years and Older (N = 1984): United States, National Health and Nutrition Examination Survey, 1999–2002

	Recent Dental Visit			Regular Dental Visits		
	Step 1 OR (95% CI)	Step 2 OR (95% CI)	Step 3 OR (95% CI)	Step 1 OR (95% CI)	Step 2 OR (95% CI)	Step 3 OR (95% CI)
DSST[a] category	1.23 (1.09, 1.37)***	1.16 (1.03, 1.29)*	1.13 (1.01, 1.26)*	1.26 (1.10, 1.45)**	1.16 (1.01, 1.32)*	1.11 (0.97, 1.27)
Sociodemographics						
Age	1.03 (1.01, 1.05)***	1.03 (1.01, 1.04)**	1.02 (1.00, 1.05)*	1.03 (1.01, 1.05)**	1.02 (1.01, 1.04)*	1.02 (1.00, 1.04)*
Female	1.18 (0.98, 1.43)	1.16 (0.96, 1.41)	0.97 (0.82, 1.16)	1.55 (1.23, 1.94)***	1.63 (1.28, 2.08)***	1.44 (1.14, 1.81)**
Education	1.44 (1.28, 1.61)***	1.35 (1.19, 1.53)***	1.20 (1.05, 1.38)**	1.43 (1.24, 1.65)***	1.33 (1.17, 1.53)***	1.16 (1.03, 1.32)*
Black	0.64 (0.51, 0.81)***	0.71 (0.55, 0.92)**	0.88 (0.67, 1.17)	0.52 (0.40, 0.69)***	0.58 (0.44, 0.77)***	0.77 (0.56, 1.06)
Hispanic	0.88 (0.64, 1.20)	0.82 (0.60, 1.13)	0.86 (0.60, 1.22)	0.69 (0.50, 0.94)*	0.68 (0.51, 0.91)**	0.75 (0.55, 1.03)
Poverty Income Ratio	1.45 (1.34, 1.56)***	1.37 (1.26, 1.48)***	1.28 (1.18, 1.39)***	1.47 (1.34, 1.62)***	1.38 (1.24, 1.52)***	1.27 (1.14, 1.42)***
Dental coverage	1.20 (0.92, 1.57)	1.18 (0.90, 1.54)	1.18 (0.90, 1.55)	1.41 (1.10, 1.81)**	1.39 (1.07, 1.81)*	1.43 (1.08, 1.90)*
Health status and behaviors						
Diabetes		0.62 (0.42, 0.92)*	0.64 (0.43, 0.94)*		0.54 (0.37, 0.81)**	0.59 (0.41, 0.86)**
Heart disease		0.74 (0.56, 0.98)*	0.71 (0.53, 0.97)*		0.90 (0.67, 1.19)	0.88 (0.65, 1.21)
Lung disease		0.83 (0.63, 1.07)	0.88 (0.64, 1.20)		0.82 (0.59, 1.12)	0.85 (0.60, 1.20)
ADL and IADL score		1.03 (0.97, 1.10)	1.02 (0.96, 1.08)		1.02 (0.95, 1.10)	1.01 (0.92, 1.11)
Healthy Eating Index score		1.02 (1.01, 1.03)***	1.02 (1.01, 1.03)***		1.02 (1.01, 1.03)***	1.02 (1.01, 1.03)***
Current smoker		0.85 (0.51, 1.40)	1.01 (0.65, 1.58)		0.80 (0.41, 1.55)	1.08 (0.59, 1.99)
Light and moderate drinker		1.48 (1.15, 1.89)**	1.34 (1.04, 1.72)*		1.73 (1.44, 2.08)***	1.60 (1.32, 1.94)***
Moderate/vigorous physical activity		1.37 (0.97, 1.93)	1.20 (0.85, 1.70)		1.61 (1.18, 2.18)**	1.43 (1.03, 1.98)*
Oral health status[b]						
Decayed teeth			0.72 (0.65, 0.80)***			0.58 (0.49, 0.69)***
Missing teeth			0.97 (0.96, 0.98)***			0.96 (0.94, 0.97)***
Self-reported oral health						
Hyposalivation score			1.43 (1.19, 1.72)***			1.41 (1.07, 1.86)*
General mouth and tooth condition			1.34 (1.16, 1.55)***			1.37 (1.18, 1.59)***
Tooth pain			1.73 (1.10, 2.74)*			0.99 (0.68, 1.44)
Area under ROC curve	0.7	0.72	0.75	0.74	0.75	0.79

Notes. OR = odds ratio; CI = confidence interval; DSST = Digit Symbol Substitution Test; ADL = activities of daily living; IADL = instrumental activities of daily living; ROC = receiver operating characteristic. Dentate individuals are those with at least 1 tooth. For the Hierarchical model, step 1 added the cognitive function measure and sociodemographic characteristics, step 2 added physical health and health behavior variables, and step 3 added oral health measures.

[a]The DSST primarily assesses psychomotor performance but also sustained attention, response speed, visuomotor coordination, and incidental memory. The score ranges from 0 to 133 points; respondents were divided into 5 groups according to DSST score percentile.

[b]Based on clinical examination.

*P < .05; **P < .01; ***P < .001.

DISCUSSION

Our results showed that as cognitive performance progressively increased, the interval since the last dental visit progressively decreased, even among those who had cognitive scores that would not be considered to be in the impaired range. In addition, the OR for cognitive function on dental care utilization declined after we controlled for covariates such as oral health measures. Our results suggest that it is likely that measures of oral health status serve as mediating variables between cognitive function and dental care utilization. Further, we extended previous findings from other studies by using data from a national probability sample with improved oral health measures derived from clinical examination.

Cognitive decline is common among older adults and is often an early sign of a progressive dementing disorder such as Alzheimer disease. The cross-sectional nature of our data, however, does not allow us to distinguish between individuals whose low cognitive score represents a decline from previous ability and those with lifelong low cognitive function. The implications of these findings may be the same regardless of the underlying cause of the low cognitive score. Presumably, these individuals may perceive dental care as of low priority and may have low self awareness of dental care needs.

Periodontal disease, at times resulting in tooth decay and loss, is a common source of chronic infection in humans and is associated with elevated levels of inflammatory markers.[30] Even a low-grade infection in the oral cavity may be associated with a moderate, subclinical systemic inflammatory response, but appropriate treatment reduces levels of inflammatory markers.[31,32] Chronic inflammation, as measured by serum interleukin 6 and C-reactive protein, is reportedly a risk factor for cardiovascular disease,[31] cognitive decline,[33,34] and Alzheimer disease.[35] Current theories posit that inflammatory processes play a major role in the etiology of Alzheimer disease.[36,37] Consistent with this, 1 study found that among monozygotic twin pairs, twins who reported the loss of all of their teeth prior to age 35 years were more likely to develop dementia than their cotwins who retained half or more of their teeth.[38] Cumulatively, these findings suggest a long-term link between oral health and cognition that can potentially be modified by health care utilization.

We also found that some chronic conditions (e.g., diabetes) and health behaviors such as healthy eating and moderate drinking, and oral health status had a significant impact on dental care utilization. Cognitive impairment and some chronic conditions, such as diabetes and heart disease, may be correlated.[39,40] A growing number of studies have suggested that cognitive impairment and nutrition are also interrelated.[41–42] Furthermore, research has shown that oral health problems increase significantly in cognitively impaired older adults, primarily those with dementia.[21,43,44] Therefore, physical health, health behaviors, and oral health appeared to be mediating variables in the linkage between cognitive function and dental care utilization.

We found that oral health status from clinical examinations and self-reports had different impact on dental care utilization. Respondents with poorer oral health status from clinical examinations were significantly less likely to have had dental care. On the other hand, individuals who reported better general oral health status, a higher level of hyposalivation, and tooth pain were more likely to have had dental visits. Our findings added new information to the existing literature by showing that not only general oral health status and tooth pain but also hyposalivation are associated with dental care utilization among older adults.[18,19,45] Our results suggest that self-awareness of oral health status is critical to an individual's decision to seek dental care.

Study Limitations

There are some limitations inherent in the survey data. The use of survey data, based on recall of past utilization, is a major limitation of this study; hence, the findings should be interpreted with caution. Although the use of survey data is a common method of studying dental services utilization, recall ability varies by respondent and may be particularly suspect among individuals with lower levels of cognitive function.

We explored this issue by comparing reported dental care utilization for the individuals who were unable to do the DSST because of cognitive impairment with individuals at the lowest scored cognitive function group. Those who did not complete the DSST had similarly low rates of routine dental checkups but a somewhat shorter interval from the most recent dental visit compared with those in the lowest scoring group on the DSST. It is possible that some individuals in the lowest cognitive function group may have erroneously reported a longer time since their most recent dental visit because of memory impairment. However, other possible explanations may apply. For example, consistent with a longer interval since their most recent dental visit, individuals with the lowest cognitive function had significantly worse oral health status (e.g., mean number of decayed teeth) than those who did not complete the test. In addition, those individuals whose cognitive impairment was severe enough to prevent them from completing the DSST would likely require assistance completing daily activities. Receiving such assistance from others may result in better oral and medical healthcare use.

Other limitations in these data exist. One limitation is that because of the cross-sectional nature of the data, we cannot fully tease apart the causal relationship between cognitive function, oral health, and utilization. Moreover, we cannot tease out whether the self-perception of poorer oral health leads to dental care or the utilization of dental care preceded and influenced the lower perception of oral health. However, the observed correlation provides an important piece of evidence that suggests a linkage between dental care use and cognitive functioning, which is of substantive and clinical importance. Hence, it is an initial but significant step in ascertaining the causal relationships involved. The single cognitive test available in NHANES (i.e., the DSST) only evaluated a segment of the multiple domains that contribute to cognitive ability. Performance below the 5th percentile would typically be considered to indicate impairment on most cognitive measures; however, low performance on this measure does not equate to dementia. Finally, in the data, age was top-coded at 85 years; therefore, no data are available for individuals older than 85 years.

In future studies, researchers need to further explore the relationship among cognitive function, oral health, and dental care utilization. Longitudinal data could be used to explore the causal relationship among these dimensions. Comprehensive measures are also needed to more accurately measure cognitive function.

Conclusions

Older adults often have limited access to dental care because of issues related to policy, finances, mobility, and competing health concerns. We addressed the important additional consideration of cognitive function. Our findings have implications for policy and program development in view of an increasing aged population and suggest that community-dwelling elders with low cognitive function are at risk for low use of dental care, which may have consequences for their oral health. Both cognitive impairment and oral health diseases are common problems among older adults. In addition, increasing evidence suggests that cardiovascular conditions, cognitive impairment, and inflammatory processes (e.g., periodontitis and other measures of oral health) are interrelated.

Our findings may increase awareness for health care professionals, including geriatric and dental care providers, of the dental care needs of older adults with low levels of cognitive function. There is also a need to improve oral health education to increase awareness of the importance of dental care among older adults, particularly those with cognitive impairment, as well as among their family members. Our findings further suggest the importance of early oral health interventions, which can be an effective way to treat oral diseases and associated problems. Understanding the linkage between cognitive function and dental care utilization is essential to studying the cost-effectiveness of treatment for diseases that cause cognitive impairment and oral health deterioration. ■

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Contributors

B. Wu initiated the study and wrote the original article. B. Plassman provided valuable advice on the analysis of cognitive function measures and contributed to the writing of the article. J. Liang contributed to the conceptual model in the article. L. Wei conducted data analysis under the supervision of B. Wu.

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Human Participation Protection

According to the Public Health Service definition, this study does not qualify as human subject research because it used publicly available, deidentified, secondary data. No approval was needed for this study.

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